of several examples of rather mixed information. The following paragraph occurs on p. 104:—

> "Ordinary dextrotartaric acid, for instance, has precisely the *same properties* as lævotartaric acid; but the compound of both which crystallizes from their mixed solutions on evaporation—racemic acid—has quite a different character. The first-named crystallize anhydrous, the last hydrated. The simple acids do not precipitate a solution of calcium sulphate. The compound acid does, and so forth. Yet it should be emphasized that such *differences* only occur with *solid* compounds; racemic acid behaves in *solution like a mixture* of the two components."

Seeing that this book is one of the very few in which Van der Waals's work obtains the prominence which it deserves, and which has been long delayed, it seems a pity that pains have not been taken to make the account accurate.

On p. 67 the reader is led to infer that b in Van der Waals's equation is the volume of the molecules; the true value of b is four times the volume of the molecules. Again, on p. 90, it is stated that the equation "is deduced only for the case where the volume of the substance is eight times as large as the magnitude b"; correctly given, this should be, "is deduced for cases where the volume is greater than $2b$."[1]

Admirable as may be the exposition of the theory of solution from the advanced standpoint here taken up, it may rightly be questioned whether the student is fairly treated. The physical theory of solution, the dissociation hypothesis, no one knows better than the author, are still strongly contested: should the student therefore not have heard a little more of the other side of the question? Particularly objectionable is the application of such terms as Boyle's law, Gay Lussac's law, &c., to solutions. In the opening chapters of the book the reader is familiarized with the kinetic theory of gases; he is enabled to form a mental picture of the mechanism which results in the pressure of a gas. How he, or, indeed, anyone, can form a similar picture for a solution, when the molecules of the solvent have also to be taken into consideration, it is difficult to imagine. By using for solutions a term such as Boyle's law, which for gases is capable of a perfectly definite interpretation, the real difficulty of the question is ignored, and misconception is almost sure to arise, especially in the case of the beginner.

We noticed in passing that, on p. 364, polybasic is used for dibasic; on p. 370, $k_1a = k'_2h^2a$ should be $k_1a = k'_1h^2a$. Frequently there is no distinction between the type of letters occurring in formulæ, and that in which the book is printed. Reference in the body of the book to portions of formulæ is therefore apt to lead to confusion, and in any case lacks clearness, as may be seen on pp. 297 and 369.

The work, from its very title, apart even from the reputation of the author, will no doubt appeal to a large class of readers; as an English text-book of chemistry it is unique. We venture to think, however, that if such points as those indicated were attended to, particularly the question of space, its sphere of usefulness would be materially enlarged. J. W. R.

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[1] Physical Society Memoirs, i. 3, 453.

UNITED STATES FISH COMMISSION REPORTS.

Bulletin of the United States Fish Commission. Vol. VIII. for 1888. (Washington, 1890.)

IN 1881 the Senate and House of Representatives of the United States of America authorized the public printer to print from time to time any matter furnished to him by the United States Commissioner of Fish and Fisheries relative to new observations, discoveries, and applications connected with fish culture and the fisheries. The printed matter was to be capable of being distributed in parts, the whole was to form an annual volume or Bulletin not exceeding 500 pages, and the edition was to be limited to 5000 copies.

Seven volumes of this important series have since been published, and have been noticed in our pages. They were composed chiefly of translations or republications of articles on fish or fisheries which had appeared in European periodicals or as State documents; extracts from the official correspondence, with statistics of work done; and often of short articles of direct scientific interest on American fish; the whole forming a most valuable, practical encyclopædia of everything relating to the economic study of fish.

An eighth volume, dated 1890, but being the Bulletin for 1888, has just been issued from the Washington Press. The increased operations of the United States Fish Commission during 1888 have made it possible to devote almost the whole of this volume to the results of the work of the Commission, and it will be found to contain matter of considerable interest. The size of the volume has been slightly enlarged, so as to afford room for larger illustrations.

Of the twelve memoirs or papers contained in this volume, five relate to local collections of fishes. Mr. Tarleton H. Bean gives notes on a collection made at Cozumel, Yucatan: sixty species are enumerated; two new species are described and figured. Mr. C. H. Bollman reports on the fishes of Kalamazoo, Calhoun, and Antrim counties in Michigan. Mr. S. A. Forbes contributes a preliminary account of the invertebrate animals inhabiting Lakes Geneva and Mendota, in Wisconsin, and gives some particulars of the fish epidemic in the latter lake in 1884. Mr. C. H. Gilbert describes some fish from the lowlands of Georgia. Mr. D. S. Jordan gives a report of explorations made during 1888 in the Alleghany region of Virginia, North Carolina, and Tennessee, and in Western Indiana, with an account of the fishes found in each of the river-basins of those regions.

In a review of the genera and species of Serranidæ, by D. S. Jordan and C. H. Eigenmann, we have an enumeration of all the genera and species belonging to this family found in the waters of America and Europe, together with the synonymy of each, and analytical keys by which the different groups may be distinguished. One hundred and nineteen species are admitted, and thirty-four genera. This memoir is illustrated with ten plates. Mr. J. W. Collins contributes a paper on improved types of vessels for use in the market fisheries, with some notes on British fishing-steamers; and Mr. W. F. Page gives an account of the most recent methods of hatching fish-eggs. Mr. T. H. Bean reports favourably on the feasi-

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bility of introducing the mountain mullets of Jamaica (Agonostoma) into some of the Alpine streams of the Southern States; and Mr. R. Rathbun gives a detailed report on the introduction of lobsters to the Pacific shores of the United States.

The two most important contributions to this volume are, however, those by Lieutenant Tanner, "On the Result of the Explorations of the Fishing-grounds of Alaska, Washington Territory, and Oregon during 1888," and by Mr. John A. Ryder, "On the Sturgeons and Sturgeon Industries of the Eastern Coast of the United States."

Although it had been known for many years that the Pacific coasts of North America were abundantly provided with edible fishes, it was not until 1880 that the exact species of these were correctly determined; the Alaskan cod proving to be the same species as that of the North Atlantic. The absence of large and convenient markets hindered the development of the Pacific coast fisheries; but, with the completion of the railroad system, this state of things has changed, and a strong interest is now being shown in all that relates to the development of the fish industry. This Report affords us the first accurate information that has been obtained respecting most of the fishing-grounds in Alaska. The five banks whose positions were indicated by older surveys—namely, Davidson, Sannakh, Shumagin, Albatross, and Portlock banks—were more thoroughly examined than were the intervening areas, some of which, however, may, upon further examination, prove to contain fishing-banks of equal value, and not inferior in size, to at least the smaller of the banks mentioned.

Good fishing was obtained at nearly all localities where trials were made with hand-lines, whether upon defined banks or upon the more level grounds between them, and it seems natural to infer that the entire submerged plateau from off Unalashka Island to Fairweather Ground is one immense fishing-bank, limited upon the outer side only by the abrupt slope, which may be said to begin about the 100-fathom curve.

Although the great bulk of this Report relates to the fishing-banks and fishes, yet we get various glimpses of many interesting facts relating to other of the vertebrate and to many of the invertebrate forms met with. Off Popoff Island, large masses of sea-urchins, star-fishes, and large Medusæ were found in the seine nets, and the hooks became entangled with fine specimens of sea-pens (Pennatula). At the Lighthouse Rocks a landing was made, to examine a large rookery of Steller's sea-lion (*Eumetopias stelleri*). Several hundreds of these animals were found crowded together upon a very limited area. As the party landed, the old sea-lions came tumbling down over the rocks in great eagerness to reach the sea; a few, whose retreat was intercepted, were seen to jump from their high positions directly into the water, apparently sustaining no injury from the plunge, although the distance was considerable, especially for such large animals. A couple of killer whales (Orca), attracted by the disturbance and the sight of so many seals in the water, came quite close to the rocks, causing the seals to gather nearer the shore, and to cast frightened looks of alarm towards the whales, whose dorsal fins showed not less than four feet above the surface of the water. These rocks were entirely destitute of vegetation. Off Trinity Islands, large quantities of crustaceans, worms, mollusks, echinoderms, and sponges were taken—an especial feature of the haul consisting of over a hundred specimens of a fine large free crinoid. As all these specimens will find their way to the United States National Museum, we may expect soon to have recorded many additions to the marine fauna of the North Pacific.

Mr John A. Ryder's paper will also be perused with great interest. Having undertaken to report on the sturgeons and sturgeon fisheries of the eastern rivers of the United States, he repaired in May 1888 to Delaware City, which is described as a very important centre of the sturgeon fishery. Two species of the genus Acipenser are to be found in the waters along the Atlantic coast of the United States; these are *A. sturio*, L., and *A. brevirostris*, Le Sueur. The former (the common sturgeon) is the only one of any commercial importance at Delaware, as Le Sueur's species is so rare that only five specimens of it were taken by Mr. Ryder; and since the date of its first being described, in 1817, it does not appear to have been until now again recognized. Of the other American species, one is the very distinct fresh-water sturgeon of the Lake region, and two others are to be found on the Pacific coast.

The embryological data of this memoir have been in a good measure drawn from the author's original investigations, but he has fortunately also given us in addition details from the writings of Balfour, Knoch, Parker, Zograff, and Salensky. He found it perfectly practicable to fertilize artificially the sturgeon's roe, and thinks it possible that millions of young sturgeon might be developed in this way. He treats in detail of the dermal armature of the sturgeon's body, illustrating this part of his subject by numerous photogravures, describes the organs of locomotion, the lateral line system, the viscera, and lymphatics. The sources of the food of this fish and its peculiar habits are next considered, and special information is given about the preparing of the flesh for market, and the manufacture of the caviare. A very useful bibliography of the literature relating to the sturgeon is appended. This memoir is illustrated by twenty-two plates.

THE CATALOGUE OF THE WASHINGTON MEDICAL LIBRARY.

Index Catalogue of the Library of the Surgeon-General's Office, U.S. Army. Vol. XI. Phædronus—Régent. Pp. 1102. (Washington, 1890.)

THE appearance of these very fine folios year by year for the last eleven years is a very good proof to all lovers of books and collections of books in Europe that they have some sympathetic friends in America who have the will and the power to make one at least of their finest libraries well known throughout the world. Its title as the Library of the Surgeon-General's Office may once have sounded like the name of a collection of musty Blue books tied together with red tape; but, thanks to the energy of its Librarian, Mr. J. S. Billings, which we feel constantly in the monthly publication of the *Index Medicus*, everyone knows now that it is nothing of the kind, but

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